



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – DATA SCIENCE

THIRD SEMESTER – NOVEMBER 2022

PDS 3506 – MULTIVARIATE TECHNIQUES

Date: 25-11-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Q. No Answer ALL questions (10x 2 = 20 Marks)

- 1 Distinguish between Multiple regression and Multivariate Analysis.
- 2 State any two dependence multivariate techniques.
- 3 What is meant by communality of a variable?
- 4 What is Factor loading?
- 5 What are the methods of testing the quality of a cluster.
- 6 State the objectives and assumptions of cluster analysis.
- 7 What is a Classification matrix?
- 8 Define Discriminant scores.
- 9 How is Eigen values interpreted in a Principal Component analysis?
- 10 Define the term Lower dimensional sub spaces in PCA.

PART – B

Answer any ALL questions (5 x 8 = 40 Marks)

- 11 a. Represent the classification of various Multivariate Techniques in a Tree Diagram.
(OR)
b. Explain the scope of Multivariate analysis in the field of healthcare.
- 12 a. Why is it useful to rotate the factors? What is the most common method of rotation?
(OR)
b. Write the python code to implement factor analysis.
- 13 a. Describe the scope of cluster analysis in marketing research.
(OR)
b. Explain the terms a) Dendrogram b) Icicle plot.
- 14 a. Differentiate between two group and multiple discriminant analysis with example.
(OR)
b. Explain the procedure of performing step wise discriminant analysis.
- 15 a. Differentiate between Kernel PCA and Functional PCA.
(OR)
b. How orthogonal projections are derived in principal component analysis?

PART – C

Answer any TWO questions

(2x 20 = 40 Marks)

- 16 a. Explain the various measurement metrics used in multivariate analysis.
- b. Describe the concept of Factor Analysis and explain how it is different from ANOVA, Multiple Regression and Discriminant Analysis.
- 17 a. Discuss the similarities and difference between cluster analysis and discriminant analysis.
- b. Factory ABC produces very expensive and high qualities wires which are measured in terms of curvature and diameter. As a consultant to the factory, you get a task to automate quality control. Solve this problem by employing Discriminant analysis.

Curvature	Diameter	QC result
2.95	6.63	Passed
2.53	7.79	Passed
3.57	5.65	Passed
3.16	5.47	Passed
2.58	4.46	Not Passed
2.16	6.22	Not Passed
3.27	3.52	Not Passed

- 18 a. How does the stepwise discriminant procedure differ from the direct method?
- b. Use k-means clustering algorithm to divide the following data into two clusters.

X ₁	1	2	2	3	4	5
X ₂	1	1	3	2	3	5

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